

Pause detector adapts to signal

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You can increase the throughput of a LAN's data transmission if you transmit only during the talk-spurt period. If your detector is sensitive enough, even the pause among the words can be utilized for data transmission. The circuit in Fig 1 distinguishes between the signal and pause states in a speech signal coming from the microphone of a telephone handset. The circuit is adaptive because the threshold level of the comparator depends on the long-time average of the speech signal's power. The detector can also accommodate background noise. Even in cases of massive continuous background noise, the detector can distinguish the signal state from the nonsignal state.

Fig 1 consists of four major parts: a 2-way precision rectifier, an integrator with two time constants, a long-time integrator, and a comparator. The rectifier produces the absolute value of the incoming speech signal.

R_1 controls the gain. The rectifier's output drives the integrator. The integrator's rise is determined by τ_1 which is approximately equal to $R_2 \times C_1$. τ_2 which is approximately equal to $R_3 \times C_1$ determines the fall time. R_5 and R_6 eliminate the op amp's offset. Two time constants are necessary because the requirements for defining the beginning and the end of a speech period are different. The circuit must be able to detect quickly the beginning of a speech period; determining the end of an active period isn't as critical. Also, making the fall time somewhat longer than necessary avoids biting off the end of a word.

The long-time integrator's time constant (τ_3) equals $R_4 \times C_2$. A potentiometer controls the threshold level of the comparator. Speech quality depends on the values of all three time constants. (EDN BBS/DL SIG #937)

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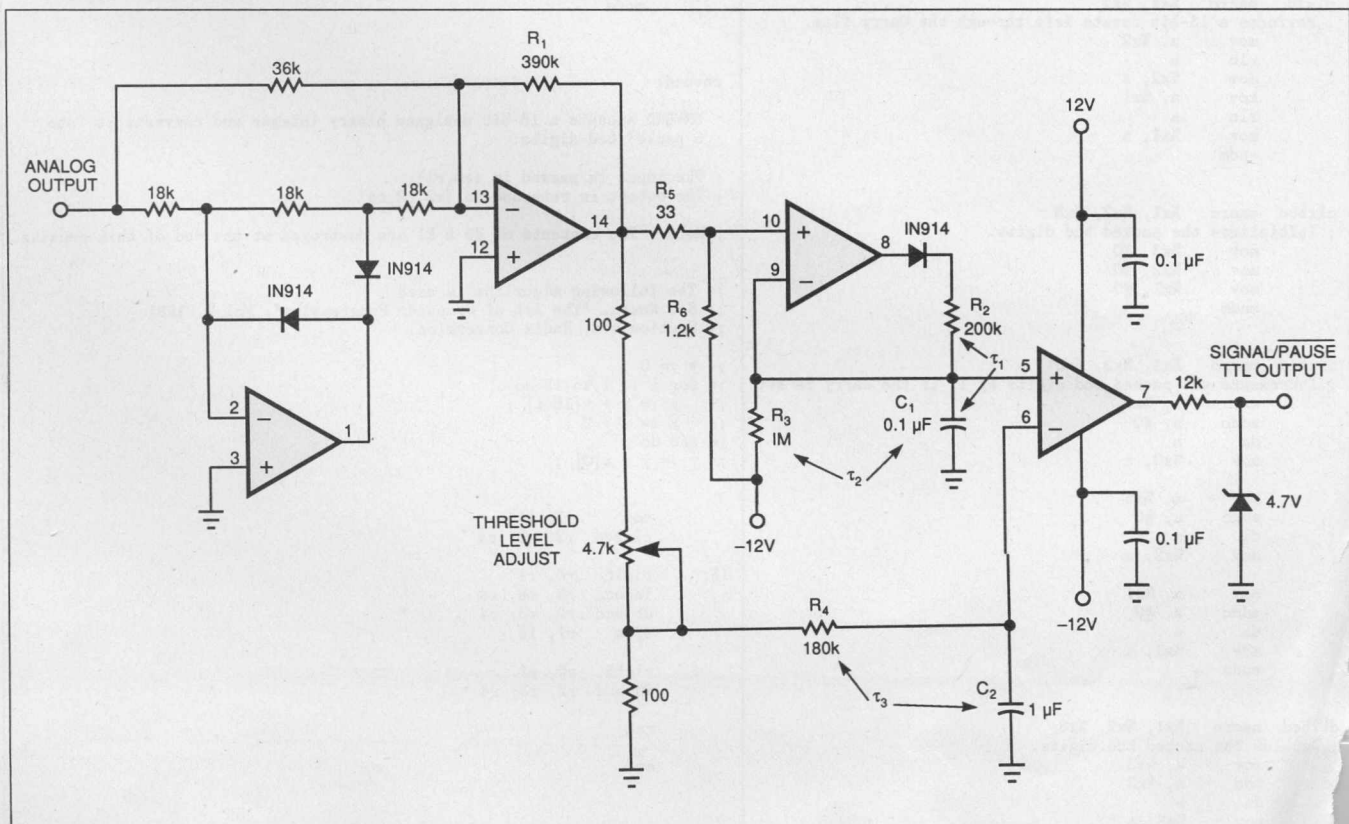


Fig 1—Three independently adjustable time constants, τ_1 , τ_2 , and τ_3 , allow this pause detector to define the beginning and end of a speech period and allow it to adapt to speech signal levels.